

# Outsourcing the Student ResNet (We've had Enough!)

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## ABSTRACT

This paper describes the problems Ithaca College faced in continuing to provide service and support for the student residential network (ResNet). It also details the rationale and decision making process to outsource ResNet and outlines the timeline of events needed to make the change by the beginning of the Fall 2004 semester.

## Categories and Subject Descriptors

K.6.1 [Computing Milieux]: Project and people management – *management techniques, staffing, strategic information systems planning, systems analysis and design, systems development*

K.6.2 [Computing Milieux]: Installation Management – *computer selection, pricing and resource allocation*

K.6.5 [Computing Milieux]: Security and Protection – *Invasive software*

## General Terms

Management, Documentation, Performance, Design, Reliability, Security, Human Factors, Legal Aspects.

## Keywords

ResNet, Outsource, Students, Support

## 1. INTRODUCTION

Ithaca College, founded in 1892, is a privately supported, accredited, residential college with approximately 6,200 undergraduate and 250 graduate students in programs of business, communications, health sciences and human performance, humanities and science, music, and interdisciplinary studies. The student body consists of approximately 43% men and 57% women coming from 45 states, 3 US territories and nearly 70 countries. There are 453 full-time faculty, 180 part-time faculty, and 953 administrative staff.

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The Information Technology Services (ITS) department provides centralized service and support for the entire campus community consisting of 2,350 computers in academic and administrative offices and 650 computers in labs and e-classrooms. ITS consists of 58 full time employees in 4 divisions overseeing technology and instructional support services, information systems and services, network and communication services, and web, systems and departmental services.

## 2. THE RESIDENTIAL NETWORK

### 2.1 In the Beginning

In the early 90s Ithaca College started to build the Residential Network (ResNet) infrastructure. ITS created a service and support model where students could bring their computers from home, fill out a form with the appropriate information and connect their computer to the college network and the Internet without charge from their room.

Initially, there were three pilot residential halls connected, and by the end of the third academic year, all residential halls were online. As more residential halls were built, ITS made sure they too were connected. Currently ResNet consists of 53 residential halls and 4400 active student ports.

### 2.2 Year after Year

Originally, ResNet was a shared network with no subnetting. For a student to activate their free connection, they had to fill out a paper form with the appropriate information including their computer hardware address and turn it into the ITS Helpdesk. This process was extremely labor intensive, so much so that ITS immediately looked to automate the registration process and did so by the next Fall startup.

Through the years, various events happened which caused ITS to reevaluate and restructure elements of ResNet.

#### 2.2.1 Network Etiquette Training

With the introduction of Napster and peer-to-peer applications, Ithaca College felt it necessary that all students be educated on the acceptable and proper use of a shared network, including copyright policies and legal ramifications. As a result, ITS presented (and continues to present) relevant information to all incoming Freshman at mandatory Orientation sessions. ITS also created an online quiz for students to take before they can activate their email account. The quiz asks questions about proper

network and account use, file sharing and the use of peer-to-peer (P2P) applications.

### 2.2.1.1 Bandwidth Speeds

When ResNet service was initially introduced, it shared the 8 Mb campus Internet connection with academic and administrative offices. The demand for faster service increased as more students brought computers to campus, more applications became web-based and the use of peer-to-peer applications grew. Consequently, ITS increased bandwidth significantly over the years (see Table 1 for the details).

**Table 1. Years / Bandwidth Connection Speeds**

Years	Bandwidth
1998	3 Mb
1999	6 Mb and then 12 Mb
2000	16 MB
2001	24 Mb
2004	Full T3 (45 Mb)

### 2.2.2 Packet Shaping

The nature of P2P traffic is such that it will utilize all available bandwidth. In 2000, ITS installed and implemented packet shaping hardware that would manage internet traffic. Over the years, bandwidth allocations changed based on demand. Table 2 illustrates the bandwidth allocations in Fall 2003.

**Table 2. Fall 2003 Bandwidth Packet Shaping Allocations**

Hours	ResNet	P2P out of ResNet allotment	All Other Traffic
8am-5pm	32 Mb 71%	6 Mb	13 Mb 29%
5-10pm	36 Mb 80%	6 Mb	9 Mb 20%
10pm – 8am	38 Mb 84%	6 Mb	7 Mb 16%

### 2.2.3 ResNet Support

Ithaca College has never made owning a computer a requirement for attendance; however over 90% of the student body brings a personal computer from home. Initially, with the roll-out of ResNet, ITS set a minimum requirement for connecting to ResNet and provided ResNet connection support.

ITS held a configuration fair to help students get connected on opening weekend in both the Fall and Spring semesters. As technology changed and more computers came with network interface cards, the Fair decreased in length from 2 days to 1 day and the support changed from drop-in, hands-on support to increased phone support and in-room appointments. All these services were provided free of charge.

Throughout the academic year, ITS would help students troubleshoot if the problem was with the computer or the network. If it was determined to be a computer problem, the student was

referred to a local vendor for repair. ITS support was limited to ResNet connections.

## 2.3 Fall 2003 Timeline (The Straw that Broke the Camel’s Back)

In August 2003, hundreds of viruses were released world wide [1]. Two weeks prior to opening weekend, early arrival students began to connect to ResNet, and ITS started to see network performance degrade. It became apparent that all a student had to do was plug into ResNet to infect their computer.

One week prior to opening weekend, ITS staff began preparing to deal with a major virus epidemic. An emergency response team was created and met daily (sometimes twice daily), the college administration and the Residential Life Office were notified, network technicians began monitoring the network and turning off individual ports of infected computers approximately 18 hours a day, a high-speed CD burner was purchased and 3,000 CDs were created containing tools to clean and patch their computers, posters were distributed and a website was created to notify the campus of the problems and solutions.

The day before opening weekend, ITS determined that the viruses could not be contained and recommended to college administration that ResNet be turned off so that ITS staff could inform all student (not just early arrivals) of the problems and have student clean and patch their computers before plugging into the network. In order to accomplish this goal, ITS staff met with all RAs to explain the problem, distribute CDs and solicit their help. ITS also staffed all check-in locations.

ResNet was turned off for 1 week. During that time, the following strategies were employed in an effort to control the epidemic:

### 2.3.1 Plan 1

ITS asked RAs to keep track of the students who cleaned their computers with the CD and, based on numbers, ITS would turn buildings back on while monitoring the infection level of that building. If the infection rate was high, the building was turned back off. This plan was in effect for approximately four days. This resulted in high levels of frustration and confusion for both students and ITS staff. ITS moved to Plan 2.

### 2.3.2 Plan 2

ITS full-time and student staff attempted to clean and patch individual computers. This plan was in effect for approximately two days and was extremely labor intensive and slow. ITS created Plan 3.

### 2.3.3 Plan 3

A goal was set to have all buildings turned back on before the Labor Day Holiday weekend. In order to do this, the port lookup procedure was partially automated in that it still required manually shutting off individual ports. Students were required to sign a form certifying that they had cleaned and patched their computer. The network technicians monitored network traffic until 11pm and shut off any necessary ports. Certified ports were turned on between 8am and 2pm. A port status list was accessible via the web and cleaning and patching tools were available online. ITS labs were open longer hours to accommodate the increased traffic. We were able to achieve our goal with this plan.

### 2.3.4 The Results

All buildings were turned back on by the Holiday weekend, however, 200+ ports were shut off and 20 or more were being turned off daily. It took approximately 3 weeks before the port status list started to decrease. Some students and parents were angry, a few even asking for tuition refunds.

## 3. ON-GOING SUPPORT ISSUES

As the academic year continued, ITS saw several more virus and worm outbreaks. Since ResNet was not subnetted every new outbreak negatively impacted network performance. Students continued to have difficulty patching their computers and updating their virus protection software.

### 3.1 Student Expectations

Students came to expect ITS be a commercial Internet Service Provider (ISP). They wanted no restrictions on access to the network and no network interruptions. They also wanted to be able to connect their gaming devices to the network and contact ITS at any time to receive support, as they could with a commercial ISP.

As these expectations were not met, their frustration increased and they became vocal. Articles and editorials were published in the student newspaper (The Ithacan [2]), an online petition was created to demand better, faster and reliable service and complaints were coming in from both students and parents.

### 3.2 Network Issues

Since ResNet was a shared network with no subnetting, viruses, worms and Trojans could easily spread and affect the entire ResNet. To combat this problem ITS divided the network into nine subnets.

Effort was also put into automating the network monitoring and port shut off process. Technical challenges could not be overcome in a timely manner. ITS continued (and would have to continue) to monitor and manually turn on and off student ports.

### 3.3 User Support Services

User support services (5 user support specialists, 5 field service technicians and 20 student employees) were overwhelmed by troubleshooting problems and providing ongoing educational services to students. Posters, newspaper ads, student meetings, workshops, websites, email alerts, CD duplication and documentation were used to educate students as to their individual responsibilities for protecting their computers and the status of ResNet.

### 3.4 Changing Legal Environment

Over time, copyright law was increasingly being enforced by copyright holders. In the 2002-2003 academic year, Ithaca College received approximately twenty-five complaints from copyright holders or their representatives. During the 2003-2004 academic year, Ithaca College received over 100 such complaints. The college looked into each infraction individually and involved the Judicial Affairs Office, a Campus Safety officer as well as a few ITS staff members.

All of these ongoing support efforts require significant time and labor for ITS and other college staff.

## 4. LONG TERM SOLUTIONS

The question arose of the feasibility of ITS continuing to provide and support ResNet service with its current resources or whether outsourcing it to a third party would be more resource effective and provide better service.

### 4.1 Continuing to Provide Services

If ITS were to continue to provide ResNet service, a new support model would need to be created to meet the following requirements: additional user support and technical staff, additional space for onsite repair, an automated network monitoring and port turn off and on procedure, increased bandwidth, additional network subnetting and unrestricted P2P networking as well as designing and implementing additional educational strategies for students.

It did not seem viable for Ithaca College to continue to make this type of long term investment.

### 4.2 Outsourcing the Services

ITS decided to evaluate outsourcing options. Outsourcing would be an option if these institutional priorities could be met:

- a tiered service plan including a no cost option for students
- onsite support
- increased bandwidth
- network architecture that would not be as affected by viruses, worms and Trojans
- a collaborative relationship and partnership with an experienced vendor who understood the academic market and the law

Bids were solicited through private communication directly with network service providers. The following companies responded to ITS request.

#### 4.2.1 Qwest

Qwest is a nationwide voice and data telecommunications company who, at the time ITS contacted them, had limited knowledge of the academic environment and a network like ResNet. In discussions with them, it became clear that they did not have the appropriate prior experience and they were eliminated from further consideration.

#### 4.2.2 Time Warner Cable/Road Runner

Time Warner Cable/Road Runner is a commercial and residential ISP that has considerable experience providing internet service. Many students already used Time Warner service at their home.

Time Warner proposed providing their regular residential service for each student at a reduced rate. However, they could not provide a free or tiered service plan. If a student wanted to get connected, they either had to purchase the Time Warner option or use dial-up service for Internet access. Time Warner would be able to provide a call center for customer service; however, they could not provide an onsite representative for troubleshooting. Additionally, in order for Time Warner to provide service to the Ithaca College campus, they would also have to build an entirely new network infrastructure whose topology was unfamiliar to the

ITS staff. ITS viewed this new network design as an obstacle. If in the future, outsourcing to this vendor was not successful, the college would still have to provide service some how.

Since Time Warner did not meet all the ITS priorities, they too fell from consideration.

### 4.2.3 Apogee Telecom

Apogee Telecom, Inc. is an Austin, Texas-based provider of custom networking solutions for higher education. Their CEO comes from an academic background and understands students and their needs. When ITS contacted them, they had 2 other colleges/universities for whom they were providing ResNet service. Apogee wanted to create a flexible partnership with Ithaca College and was willing to meet all the needs and priorities by Fall 2004 startup.

#### 4.2.3.1 Tiered Service Plan

Ithaca College negotiated a 3 tier service plan with Apogee (see Table 3 for details). The college is subsidizing the “no charge” service option for all students.

**Table 3. Service Options**

Speed	Price to Student
64 Kbps	No Charge
Up to 1.0 Mbps	\$49.95 per semester
Up to 3.0 Mbps	\$69.95 per semester

The speed is tied to the student’s Apogee username, not to the network port. Therefore, wherever they connect to the network, they will experience the speed they have purchased. It’s important to also note that all students will always have high speed access to the local campus network regardless of what service plan they have purchased.

#### 4.2.3.2 On-Site Support and Network Partners

Along with their call center, Apogee committed to initially providing a full-time site coordinator on campus. Since this is a new support model for Apogee, the need for this position will be reviewed in the future.

Apogee is also negotiating with local vendors to work with the site coordinator and provide competitive pricing and drop-off service for fixing student computers.

#### 4.2.3.3 Increased Bandwidth

Apogee will be providing bandwidth that is over three-and-a-half times greater than what ITS is currently providing. Because of this increased bandwidth, P2P networking will not be limited in any way and online gaming will be an option for students.

#### 4.2.3.4 Network Architecture

In order to be able to provide 3.0 Mbps, unlimited peer-2-peer network access and gaming devices, Apogee is installing an OC3 backbone to the Internet for ResNet. They are designing the network so that no more than 150 computers will be connected to one subnet. Along with bringing in new hardware, Apogee will also be using existing ITS hardware so that, in the future if anything changed with our partnership, ITS could easily continue to maintain and support the network.

#### 4.2.3.5 Legal Obligations and Partnership

Students agree to abide by these three policies: the Ithaca College All College Computer and Network Use Policy [3], the Student Affairs Conduct Code [4] as well as the Apogee End User Agreement [5]. Since Apogee is the ISP, they will be receiving legal notices and will work with individual students to correct problems. Ithaca College Council felt that it was important to be notified of any network and copyright violations. Apogee has agreed to notify the college when a violation occurs and Ithaca College will refer individual students to Judicial Affairs as deemed appropriate by college officials.

## 5. IMPLEMENTATION STRATEGIES

ITS wanted to ensure the project’s success and felt clear communication and a strong partnership was vital for this exchange. Project subgroups were created to oversee the details necessary to make this transition possible. The subgroups are as follows:

- Marketing and Communication
- Helpdesk Support
- Networking
- Staffing
- Sign-up Fall Startup
- Policy and Enforcement
- Student billing

### 5.1 Communication Plan

Because ResNet was a source of frustration for all, ITS decided to communicate to the students and parents immediately after the contract was signed in March of 2004. ITS felt it was imperative to be upfront and field questions and concerns in advance of the transition while the students were still on campus (see Table 4 for the communication timeline details).

**Table 4. Communication Timeline 2004**

Date	Communications
April 5	Memo to Student Government Association (SGA) detailing the decision to outsource ResNet
April 6	Attended SGA meeting to field questions
April 8	Announcement letter and article in the student newspaper. Mass email sent to all ResNet students. Website updated to reflect the decision
Week of April 12	Apogee site visit, and several meeting with student groups.
June 4	Letter sent to all parents detailing the ResNet change
Summer	Participated in Freshman Orientation
End of June	Apogee service sign-up sheet available
July	Summer mailing to all students living on campus
Mid-July	Apogee call center ready to support Ithaca College sign-ups
August	Welcome packet placed in rooms to provide support and sign-up sheets

## 5.2 Project Timeline

A detailed and specific timeline was quickly developed to keep everyone on task and the project moving along (see Table 5).

**Table 5. Project Timeline**

Date	Tasks
January - March	Contract negotiated and signed
April	Site visits
April	Subcontracted cable digging
April	Created project teams
May	Detailed helpdesk and call routing plan
June	Antivirus software plan created and finalized
June	Network design plan finalized
June	On site coordinator interviewed and hired – location found for their office
June	Legal guideline agreements between Ithaca College and Apogee created
July	Site coordinator starts working
July	Building the network infrastructure
August 1	Apogee fully controls and supports ResNet

## 6. THOUGHTS TO DATE

At the time of this writing, ITS is one month away from the Apogee startup. ITS feels a true partnership has been forged with Apogee. Apogee has demonstrated a willingness to work with

and listen to the experience of ITS. The details of implementation are enormous, but not insurmountable. Deadlines have been met and so far we are on track. We expect a smooth transition.

The decision to outsource ResNet has dramatic ramifications for both students and the ITS department. This decision involved all levels of college administration. ITS was never organized to completely dedicate its time to ResNet. Now with this outsourcing decision made, ITS will be able to fully devote more of its time and energy to achieving other institutional computer and networking goals.

## 7. ACKNOWLEDGEMENTS

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## 8. REFERENCES

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